

SN54ABT245, SN74ABT245A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCBS081E – JANUARY 1991 – REVISED JULY 1994

- State-of-the-Art *EPIC-II B*™ BiCMOS Design Significantly Reduces Power Dissipation
- ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015; Exceeds 200 V Using Machine Model (C = 200 pF, R = 0)
- Latch-Up Performance Exceeds 500 mA Per JEDEC Standard JESD-17
- Typical V_{OLP} (Output Ground Bounce) < 1 V at $V_{CC} = 5$ V, $T_A = 25^\circ\text{C}$
- High-Drive Outputs (–32-mA I_{OH} , 64-mA I_{OL})
- Package Options Include Plastic Small-Outline (DW), Shrink Small-Outline (DB), and Thin Shrink Small-Outline (PW) Packages, Ceramic Chip Carriers (FK), Ceramic Flat (W) Packages, and Plastic (N) and Ceramic (J) DIPs

description

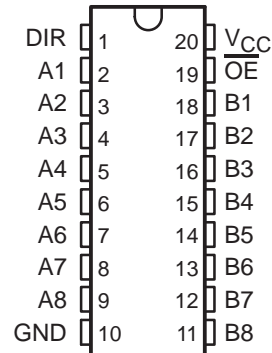
These octal bus transceivers are designed for asynchronous communication between data buses. The devices transmit data from the A bus to the B bus or from the B bus to the A bus depending upon the logic level at the direction-control (DIR) input. The output-enable (\overline{OE}) input can be used to disable the device so the buses are effectively isolated.

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

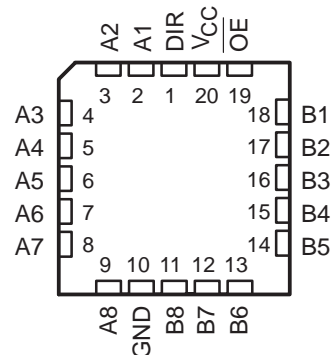
The SN74ABT245A is available in TI's shrink small-outline package (DB), which provides the same I/O pin count and functionality of standard small-outline packages in less than half the printed-circuit-board area.

The SN54ABT245 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ABT245A is characterized for operation from -40°C to 85°C .

SN54ABT245 . . . J OR W PACKAGE
SN74ABT245A . . . DB, DW, N, OR PW PACKAGE
(TOP VIEW)



SN54ABT245 . . . FK PACKAGE
(TOP VIEW)



FUNCTION TABLE

INPUTS		OPERATION
\overline{OE}	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

EPIC-II B is a trademark of Texas Instruments Incorporated.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS
INSTRUMENTS**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 1994, Texas Instruments Incorporated

SCBS081E – JANUARY 1991 – REVISED JULY 1994



SN54ABT245, SN74ABT245A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCBS081E – JANUARY 1991 – REVISED JULY 1994

recommended operating conditions (see Note 3)

		SN54ABT245		SN74ABT245A		UNIT
		MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage	4.5	5.5	4.5	5.5	V
V_{IH}	High-level input voltage	2		2		V
V_{IL}	Low-level input voltage		0.8		0.8	V
V_I	Input voltage	0	V_{CC}	0	V_{CC}	V
I_{OH}	High-level output current		–24		–32	mA
I_{OL}	Low-level output current		48		64	mA
$\Delta t/\Delta v$	Input transition rise or fall rate		5		5	ns/V
$\Delta t/\Delta V_{CC}$	Power-up ramp rate			200		$\mu s/V$
T_A	Operating free-air temperature	–55	125	–40	85	$^{\circ}C$

NOTE 3: Unused or floating pins (input or I/O) must be held high or low.



SN54ABT245, SN74ABT245A

OCTAL BUS TRANSCEIVERS

WITH 3-STATE OUTPUTS

SCBS081E – JANUARY 1991 – REVISED JULY 1994

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS	T _A = 25°C			SN54ABT245		SN74ABT245A		UNIT	
			MIN	TYP†	MAX	MIN	MAX	MIN	MAX		
V _{IK}		V _{CC} = 4.5 V, I _I = −18 mA	−1.2			−1.2		−1.2		V	
V _{OH}		V _{CC} = 4.5 V, I _{OH} = −3 mA	2.5			2.5		2.5		V	
		V _{CC} = 5 V, I _{OH} = −3 mA	3			3		3			
		V _{CC} = 4.5 V	I _{OH} = −24 mA	2			2				
			I _{OH} = −32 mA	2*					2		
V _{OL}		V _{CC} = 4.5 V	I _{OL} = 48 mA	0.55			0.55				V
			I _{OL} = 64 mA	0.55*					0.55		
I _I	Control inputs	V _{CC} = 0 to 5.5 V, V _I = V _{CC} or GND	±1			±1		±1		μA	
	A or B ports	V _{CC} = 2.1 V to 5.5 V, V _I = V _{CC} or GND	±20			±100		±20			
I _{OZPU}		V _{CC} = 0 to 2.1 V, V _O = 0.5 V to 2.7 V, \overline{OE} = X	±50					±50		μA	
I _{OZPD}		V _{CC} = 2.1 V to 0, V _O = 0.5 V to 2.7 V, \overline{OE} = X	±50					±50		μA	
I _{OZH} ‡		V _{CC} = 2.1 V to 5.5 V, V _O = 2.7 V, \overline{OE} ≥ 2 V	10			10		10		μA	
I _{OZL} ‡		V _{CC} = 2.1 V to 5.5 V, V _O = 0.5 V, \overline{OE} ≥ 2 V	−10			−10		−10		μA	
I _{off}		V _{CC} = 0, V _I or V _O ≤ 4.5 V	±100					±100		μA	
I _{CEX}	Outputs high	V _{CC} = 5.5 V, V _O = 5.5 V	50			50		50		μA	
I _O §		V _{CC} = 5.5 V, V _O = 2.5 V	−50	−140	−180	−50	−180	−50	−180	mA	
I _{CC}	A or B ports	V _{CC} = 5.5 V, I _O = 0, V _I = V _{CC} or GND	Outputs high		5	250	250		250		μA
			Outputs low		22	30	30		30		mA
			Outputs disabled		1	250	250		250		μA
ΔI _{CC} ¶	Data inputs	V _{CC} = 5.5 V, One input at 3.4 V, Other inputs at V _{CC} or GND	Outputs enabled		1.5		1.5		1.5		mA
			Outputs disabled		50		50		50		μA
	Control inputs	V _{CC} = 5.5 V, One input at 3.4 V, Other inputs at V _{CC} or GND		1.5			1.5		1.5		mA
C _i	Control inputs	V _I = 2.5 V or 0.5 V	4							pF	
C _{io}	A or B ports	V _O = 2.5 V or 0.5 V	8							pF	

* On products compliant to MIL-STD-883, Class B, this parameter does not apply.

† All typical values are at V_{CC} = 5 V.

‡ The parameters I_{OZH} and I_{OZL} include the input leakage current.

§ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

¶ This is the increase in supply current for each input that is at the specified TTL voltage level rather than V_{CC} or GND.

SN54ABT245, SN74ABT245A

OCTAL BUS TRANSCEIVERS

WITH 3-STATE OUTPUTS

SCBS081E – JANUARY 1991 – REVISED JULY 1994

switching characteristics over recommended ranges of supply voltage and operating free-air temperature, $C_L = 50$ pF (unless otherwise noted) (see Figure 1)

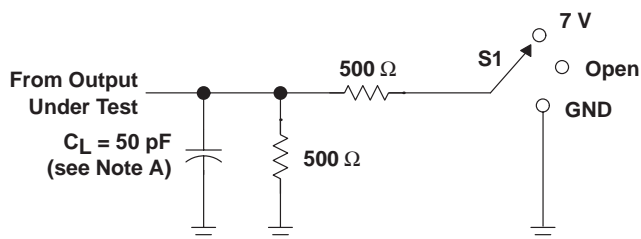
PARAMETER	FROM (INPUT)	TO (OUTPUT)	SN54ABT245					SN74ABT245A					UNIT
			V _{CC} = 5 V, T _A = 25°C			MIN	MAX	V _{CC} = 5 V, T _A = 25°C			MIN	MAX	
			MIN	TYP	MAX			MIN	TYP	MAX			
t _{PLH}	A or B	B or A	1	2.6	4.1	1	4.8	1	2	3.2	1	3.6	ns
t _{PHL}			1	2.9	4.2	1	4.8	1	2.6	3.5	1	3.9	
t _{PZH}	OE	A or B	1.3	3.3	4.8	1	5.9	2	3.5	4.5	2	5.6	ns
t _{PZL}			2.3	4.3	5.8	2	7.5	1.9	4	5.3	1.9	6.2	
t _{PHZ}	OE	A or B	1.7†	4.7	6.2	1.7	7.4	2.2	4.4	5.4	2.2	5.9	ns
t _{PLZ}			1.7†	4.3	5.8	1.7	6.5	1.5	3	4	1.5	4.5	

[†] This data sheet limit may vary among suppliers.

SN54ABT245, SN74ABT245A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

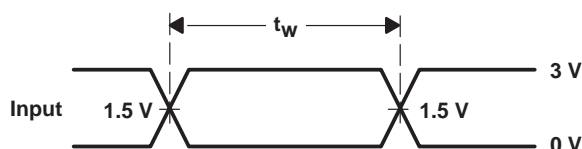
SCBS081E – JANUARY 1991 – REVISED JULY 1994

PARAMETER MEASUREMENT INFORMATION

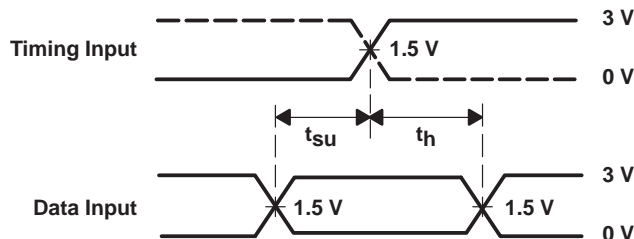


LOAD CIRCUIT FOR OUTPUTS

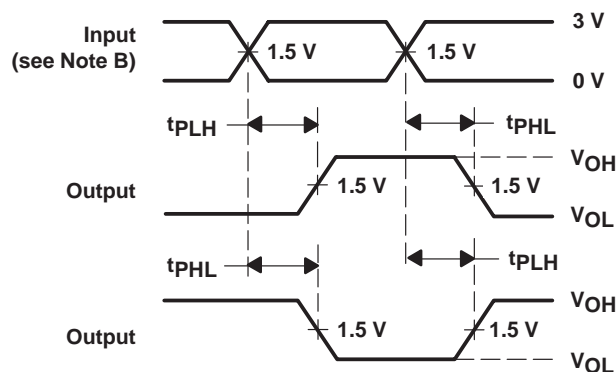
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	7 V
t_{PHZ}/t_{PZH}	Open



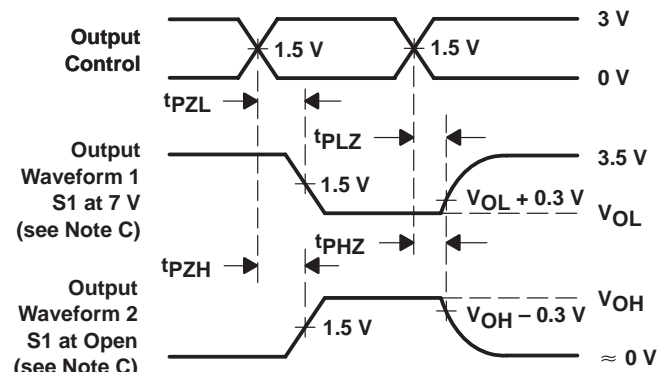
VOLTAGE WAVEFORMS
PULSE DURATION



VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS



VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
LOW- AND HIGH-LEVEL ENABLING

- NOTES: A. C_L includes probe and jig capacitance.
B. All input pulses are supplied by generators having the following characteristics: $PRR \leq 10$ MHz, $Z_O = 50 \Omega$, $t_r \leq 2.5$ ns, $t_f \leq 2.5$ ns.
C. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
D. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.